

NOTES ON SOME EXPERIMENTS WITH THE ACTIVE PRINCIPLE OF MESEMBRIANTHEMUM TORTUOSUM, L.

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This plant, which goes under the broad designation of "Hottentot's Kauwgoed," grows in the Karoo, the locality from which the supply under consideration was obtained being Fortuin, near Matjesfontein. Like many other Cape plants, it has great medicinal virtues ascribed to it, chief of which are its soporific influence on young children and its curative and quieting effect on them when suffering from acidity. It is alleged that for these purposes the plant is very widely used, the method of procedure being that one or two drops of the juice of the green plant is given to the child, who then enjoys a deep, quiet rest for several hours. This assured effect I ascribed to the alkaline nature of the juice, which is so great that it is said to be used for washing clothes when soap is not obtainable.*

In November, 1889, I procured a small supply of the plant, and which Professor McOwan kindly identified for me botanically, for the purpose of making an examination of it, and I found it to contain an alkaloidal principle which, when injected into a frog, soon produced a marked hypnotic effect. These experiments were then allowed to drop for several years, but since then some clinical experiments with a tincture of the dried plant proved that it had decided anodyne properties without concomitant bad effects. I have thought it might be interesting to bring this plant more prominently forward.

The method of isolating the Active Principle, after some preliminary experimenting, was as follows :

A strong decoction of the dried plant was made in water. After filtration this was concentrated to a convenient bulk, and acetate of lead was added to precipitate the tannin and other vegetable acids

* Since writing the above my attention has been drawn to the following :

"This species (*Mesembr. tort.*, L.), a native of the Karoo, appears to possess narcotic properties. The Hottentots, who know it by the name of 'Kauwgoed,' are in the habit of chewing it, and become intoxicated, while the farmers use it in the form of a decoction or tincture as a good sedative" (Pappe. Flor. Cap. Mcd. Prodromus, 1868).

and inert organic matter. A voluminous precipitation took place. This was filtered off, and to the filtrate was added solution of subacetate of lead, when a further precipitation took place. It was again filtered. The precipitates so obtained were not examined further. The filtrate was rendered alkaline by the addition of liquid ammonia, when a third precipitate fell. This precipitate was preserved for later examination. The lead was removed from the filtrate by means of sulphuretted hydrogen. The liquid was then concentrated over a water-bath to a small quantity, rendered acid by the addition of dilute sulphuric acid, and Mayer's solution ($\text{HgI}_2 + 6\text{KI}$) was added until no further precipitation took place.

The precipitate was allowed to settle, and was washed with water. After suspending it in a little water, sulphuretted hydrogen was passed through it to precipitate the mercury, which was separated by filtration; the filtrate was rendered alkaline and shaken together with chloroform (3) and ether (1) in a suitable separator (ether alone from previous experiments not being considered a good solvent of the alkaloid). The chloroform solution containing the alkaloid, after separation, was removed and spontaneously evaporated to dryness in a capsule.

No crystals were visible in the residue, which was next dissolved in water with the addition of a drop of dilute sulphuric acid. A few drops of this solution were evaporated on a microscopic slide, when the sulphate of the alkaloid crystallised out.

The solution gave the following reactions:

With fixed Alkalies	...	...	...	...	No ppt.
With Picric Acid	...	...	...	...	Yellow Amorph. ppt.
With Tannic Acid	...	...	...	...	Ppt. sol. in H_2SO_4 insol. in Ammon.
With Phosphomolybdic Acid	...	...	...	...	Yellow Amorph. ppt.
Wagner's Sol. (KI + I)	...	...	...	...	Brown ppt.
With Dragendorff's Sol. (KI + Bi)	...	...	...	...	Ppt. sol. in H_2SO_4 insol. in Ammon.
With Mayer's Sol. ($\text{HgI}_2 + 6\text{KI}$)	...	...	...	...	Dense ppt.
With Merc. Perchl.	...	...	...	...	Cloudiness
With Gold Chloride	...	...	...	...	Cloudiness

These reactions indicate the principle to be an alkaloid.

The precipitate obtained after treatment with lead and ammonia was examined, but it was found to contain a trace only of possibly the same alkaloid.

To test the alkaloid physiologically one or two drops of its solution were injected under the skin of a frog. Within a few minutes an

apparent effect is noticeable, such as hurried breathing, uneasiness, and a marked moistness of the skin. In about ten to twenty minutes' breathing only takes place at long intervals, and when the frog is placed on its back it cannot right itself. Reflex action seems to be marked and consciousness to be retained. After an interval of from four to eight hours entire recovery takes place, although in some cases they have died. This is an average case of a good many experiments. The effect on frogs seems so peculiar that it could almost be considered a test for the drug. On guineapigs the effect is slight even in doses ten times as much as for a frog, uneasiness and refusal of food being the only apparent effect. In two cases of experiment the one guineapig died twenty-four hours afterwards, the other one recovering altogether in that time.

In conclusion I wish to say that in 1894 I mentioned the above results, and gave a small quantity (all I had) of the plant to Dr. Rubenstein, then on his way to Germany. He writes to say that Dr. Fromm, in Freiburg, had found it to contain a chemical body capable of being crystallised (alkaloid or glucoside?), which, contrary to his (Dr. Rubenstein's) expectations, does not resemble curara, but rather morphine, but through want of material further research was impossible.

Although these notes do not pretend to be an exhaustive examination of the constituents of the plant, nor of the alkaloid itself, and this must be left to others better able to do so, still, should they have incited interest in original research in this direction, my object would have been attained.

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